North Central Texas Council of Governments

Digging into Soil Health- Principles to Protect our Water

NCTCOG Webinar
May 22, 2024

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Texas Commission on Environmental Quality

EPA United States Environmental Protection Agency

North Central Texas Council of Governments Environment & Development

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Procedures for Webinar

- The webinar is being recorded and will be posted to NCTCOG's website under the green banner called "Webinars" here:
- https://www.nctcog.org/envir/natural-resources/water-resources

- If you submitted a RSVP for this webinar, you will receive an email with the presentation slides, and eventually, a link to the recording. If you did not RSVP and would like these webinar materials, please email aknox@nctcog.org.

- Please keep your microphone on mute until the Question-and-Answer period at the end of each presentation.

- Thank you!

Webinar Agenda

- Welcome and Introduction of Speakers
  - **“Planning for Healthier Soils”-** Brian Koch
  - **“Combating Drought with Soil Health”-** Dennis Brezina
- Time for Q & A after each presentation

Speaker Introduction

Brian Koch

- Regional Watershed Coordinator, Texas State Soil and Water Conservation Board

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BUILDING HEALTHY SOILS THROUGH PLANNING

BRIAN KOCH

TEXAS STATE SOIL & WATER CONSERVATION BOARD

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AGENCY ROLE

WATER QUALITY MANDATE - TEXAS AGRICULTURE CODE §201.026

TEXAS STATE SOIL AND WATER CONSERVATION BOARD (TSSWCB) IS THE LEAD AGENCY IN TEXAS RESPONSIBLE FOR PLANNING, IMPLEMENTING AND MANAGING PROGRAMS AND PRACTICES FOR ABATING AGRICULTURAL AND SILVICULTURAL NONPOINT SOURCE WATER POLLUTION.

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AGENCY ROLE

- PROVIDE TECHNICAL AND FINANCIAL ASSISTANCE TO LOCAL SOIL AND WATER CONSERVATION DISTRICTS
  - *LOCAL DISTRICTS ENCOURAGE LANDOWNERS AND AGRICULTURAL PRODUCERS TO VOLUNTARILY CONSERVE NATURAL RESOURCES ON THEIR PRIVATE LANDS THROUGH THE IMPLEMENTATION OF BEST MANAGEMENT PRACTICES*
- RESULTS IN A POSITIVE IMPACT ON STATE WATER RESOURCES, AND PROTECTS SOIL QUALITY WHICH SUPPORTS THE STRENGTH OF TEXAS' AGRICULTURAL ECONOMY

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HOW THIS GETS DONE

TSSWCB ADMINISTERS SEVERAL PROGRAMS TO ACHIEVE CONSERVATION GOALS ACROSS THE STATE, THEY INCLUDE:

- WATER QUALITY MANAGEMENT PLAN PROGRAM
- NONPOINT SOURCE GRANT PROGRAM
- FLOOD CONTROL PROGRAM

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SOIL HEALTH AND WATER QUALITY

A FEW REASONS WHY SOIL HEALTH PRACTICES CAN BE BENEFICIAL TO WATER QUALITY

- INCREASED WATER HOLDING CAPACITY IN THE SOIL REDUCES RUNOFF
- INCREASED PLANT VIGOR AND DEEPER ROOTS CAN INCREASE WATER INFILTRATION
- REDUCED TILLAGE AND COVER CROPS CAN HELP DECREASE EROSION (WIND AND WATER) AND DECREASED LOSSES OF NITRATE UP TO 88% AND PHOSPHOROUS UP TO 92% IN DIFFERENT STUDIES
- ADDITIONAL BENEFITS ARE POSSIBLE

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WHY HEALTHY SOIL MATTERS

HEALTHY SOIL GIVES US CLEAN AIR AND WATER, BOUNTIFUL CROPS AND FORESTS, PRODUCTIVE GRAZING LANDS, DIVERSE WILDLIFE, AND BEAUTIFUL LANDSCAPES. SOIL DOES ALL THIS BY PERFORMING FIVE ESSENTIAL FUNCTIONS:

- REGULATING WATER - SOIL HELPS CONTROL WHERE RAIN AND IRRIGATION WATER GOES. WATER AND DISSOLVED SOLIDS FLOW OVER THE LAND OR INTO AND THROUGH THE SOIL.
- SUSTAINING PLANT AND ANIMAL LIFE - THE DIVERSITY AND PRODUCTIVITY OF LIVING THINGS DEPENDS ON SOIL.
- FILTERING AND BUFFERING POTENTIAL POLLUTANTS - THE MINERALS AND MICROBES IN SOIL ARE RESPONSIBLE FOR FILTERING, BUFFERING, DEGRADING, IMMOBILIZING, AND DETOXIFYING ORGANIC AND INORGANIC MATERIALS, INCLUDING INDUSTRIAL AND MUNICIPAL BY-PRODUCTS AND ATMOSPHERIC DEPOSITS.
- CYCLING NUTRIENTS - CARBON, NITROGEN, PHOSPHORUS, AND MANY OTHER NUTRIENTS ARE STORED, TRANSFORMED, AND CYCLED IN THE SOIL.

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WHY HEALTHY SOIL MATTERS

FOR EVERY 1% INCREASE IN SOIL ORGANIC MATTER THAT RESULTS IN UP TO 25,000 GALLONS OF WATER PER ACRE INFILTRATED

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WHAT DOES A HEALTHY SOIL LOOK LIKE?

- AGGREGATED "CHOCOLATE CAKE" APPEARANCE
- USUALLY DARKER COLORED
- FULL OF LIFE (A TEASPOON OF HEALTHY SOIL CONTAINS BILLIONS OF ORGANISMS)
- MOIST BUT NEVER SATURATED APPEARANCE

WHAT DOES A HEALTHY SOIL LOOK LIKE?

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HOW WE MAKE OUR SOILS HEALTHIER

- UNDERSTAND YOUR CONTEXT
- COVER THE SOIL
- REDUCE SOIL DISTURBANCE (BIOLOGICAL, MECHANICAL AND CHEMICAL)
- KEEP PLANTS GROWING THROUGHOUT THE YEAR TO FEED THE SOIL
- DIVERSIFY AS MUCH AS POSSIBLE USING CROP ROTATION AND COVER CROPS
- INCORPORATE LIVESTOCK

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UNDERSTAND YOUR CONTEXT

- WHAT ARE YOU MANAGING FOR?
- WHAT IS YOUR CLIMATE?
- WHAT IS YOUR SOIL TYPE?
- ANY OTHER FACTORS THAT INFLUENCE YOUR DECISIONS

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COVER THE SOIL

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MINIMIZE DISTURBANCE

MINIMIZING SOIL DISTURBANCE IS A GOOD START TO REBUILDING SOIL AGGREGATES, PORE SPACES, SOIL GLUE, AND SOIL ORGANIC MATTER. THIS IS AN ESSENTIAL STEP FOR LONG TERM SOIL PRODUCTIVITY.

SOIL DISTURBANCE CAN GENERALLY OCCUR IN DIFFERENT FORMS:

- BIOLOGICAL DISTURBANCE, SUCH AS OVERGRAZING, WHICH LIMITS THE PLANTS ABILITY TO HARVEST CO2 AND SUNLIGHT.
- CHEMICAL DISTURBANCE, SUCH AS OVER APPLICATION OF NUTRIENT AND PESTICIDE, CAN DISRUPT THE SOIL FOOD WEB FUNCTIONS.
- PHYSICAL DISTURBANCE, SUCH AS TILLAGE OR OVERUSE OF AN AREA BY LIVESTOCK, OR MOWING TOO SHORT

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MINIMIZE DISTURBANCE

- ULTIMATELY TILLAGE RESULTS IN ONE OR MORE OF THE FOLLOWING:
- WATER EROSION; TRANSPORTING SOIL, NUTRIENT, AND WATER TO OFFSITE LOCATIONS, WHICH NEGATIVELY IMPACTS WATER QUALITY AND QUANTITY.
- WIND EROSION; TRANSPORTING SOIL, AND NUTRIENT TO OFFSITE LOCATIONS, WHICH NEGATIVELY IMPACTS AIR QUALITY, HUMAN HEALTH, AND ANIMAL HEALTH.
- PONDING WATER; WHICH STAYS SATURATED ON THE SURFACE FOR LONG PERIODS OF TIME, A RESULT OF REDUCED INFILTRATION AND INCREASED RUNOFF.
- CRUSTING EASILY, WHICH RESTRICTS PLANT EMERGENCE.
- SOIL ORGANIC MATTER DEPLETION.

MINIMIZE DISTURBANCE

TALE OF 2 SOILS OR 2 DIFFERENT MANAGEMENT PRACTICES?

SOIL ON THE TOP: SANDY LOAM, 4 DAYS AFTER 1.5 INCH OF RAIN, CONVENTIONAL TILLAGE (DISK, PLOW, HIPPER)

BOTTOM SOIL: HEAVY BLACK CLAY, 5 DAYS AFTER 7+ INCHES OF RAIN, NO TILL

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MAXIMIZE PLANT DIVERSITY

- WE CAN START TO MIMIC THE ORIGINAL PLANT COMMUNITY BY USING CROP ROTATIONS WHICH INCLUDE ALL FOUR CROP TYPES.
- DIVERSE CROP ROTATIONS PROVIDE MORE BIODIVERSITY, BENEFITING THE SOIL FOOD WEB; WHICH IN TURN IMPROVES RAINFALL INFILTRATION AND NUTRIENT CYCLING, WHILE REDUCING DISEASE AND PESTS.
- CROP ROTATIONS CAN ALSO BE DESIGNED TO INCLUDE CROPS WHICH ARE; HIGH WATER USERS, LOW WATER USERS, TAP ROOT, FIBROUS ROOT, HIGH CARBON CROPS, LOW CARBON CROPS, LEGUMES, AND NON-LEGUMES TO NAME A FEW.

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MAXIMIZE PLANT DIVERSITY

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MAINTAIN CONTINUOUS LIVING ROOTS

- PLANTS HAVE THE ABILITY TO FEED THE SOIL THROUGH PHOTOSYNTHESIS, WHICH IS BASICALLY USING THE SUN'S ENERGY TO CREATE FOOD (SUGARS/"LIQUID CARBON") AND MOVE IT THROUGH THE PLANT TO THE ROOTS HELPING BOOST SOIL MICROBES AND OTHER SOIL LIFE
- THIS BASICALLY CREATES AN ECONOMY BUILT ON A LIQUID CARBON PATHWAY THAT BARTERS SUGARS FOR NUTRIENTS BETWEEN THE PLANTS AND SOIL BIOLOGY
- THIS IS WHY IT IS IMPORTANT TO MAINTAIN A LIVING ROOT OR LIVING PLANTS THROUGHOUT THE YEAR OR AS LONG AS POSSIBLE
- PERENNIAL PLANTS ARE ULTIMATELY THE BEST SOIL BUILDERS AND ARE KEY TO DEVELOPING LONG TERM SOIL HEALTH

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MAINTAIN CONTINUOUS LIVING ROOTS

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LIVESTOCK INTEGRATION

ANIMALS, PLANTS, AND SOILS HAVE PLAYED A SYNERGISTIC ROLE TOGETHER OVER TIME. IN RECENT YEARS, ANIMALS ARE PLAYING A REDUCED ROLE DUE TO BEING PLACED IN CONFINEMENT AND FEWER FARMS NOW INCLUDE LIVESTOCK AS PART OF THEIR OVERALL OPERATION.

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LIVESTOCK INTEGRATION

HOW DO WE RETURN LIVESTOCK TO THE LANDSCAPE?

- WINTER AND FALL GRAZING COVER CROPS AND ANNUAL CROP RESIDUES.
- SUMMER GRAZING A FULL SEASON COVER CROP, ALLOWING ADEQUATE PLANT RECOVERY, FOLLOWED BY A SECOND GRAZING DURING THE FALL OR WINTER.
- WINTER FEEDING ON HAYLAND FIELDS BY ROLLING OUT BALES OR BALE GRAZING.
- SEED ROTATIONAL PERENNIALS, GRAZE AND MANAGE AS PART OF THE CROP ROTATION.

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LIVESTOCK INTEGRATION

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WATER QUALITY MANAGEMENT PLAN PROGRAM

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WQMP PROGRAM HISTORY

- CREATED BY THE 73RD TEXAS LEGISLATURE IN 1993 THROUGH SENATE BILL 503 (OFTEN REFERRED TO AS 503 PROGRAM, OR 503 PLANS, OR 503 COST-SHARE)

- VOLUNTARY ENROLLMENT IN WQMP PROGRAM FOR FARMERS AND RANCHERS, EXCEPT THAT THE 77TH TEXAS LEGISLATURE IN 2001 (SENATE BILL 1339) SAID POULTRY OPERATIONS MUST OBTAIN A WQMP

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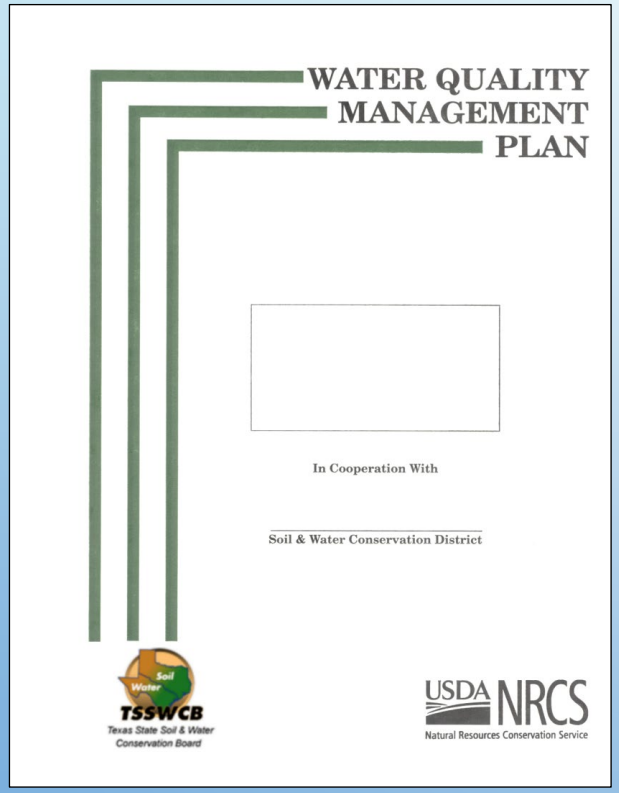
WATER QUALITY MANAGEMENT PLANS



- SITE-SPECIFIC PLAN FOR LAND IMPROVEMENT MEASURES DEVELOPED THROUGH SWCD FOR AGRICULTURAL LANDS
- PROVIDES FARMERS AND RANCHERS A VOLUNTARY OPPORTUNITY TO ACHIEVE A LEVEL OF POLLUTION PREVENTION OR ABATEMENT CONSISTENT WITH STATE WATER QUALITY STANDARDS
- INCLUDES APPROPRIATE AND ESSENTIAL LAND TREATMENT PRACTICES, PRODUCTION PRACTICES, MANAGEMENT MEASURES, OR TECHNOLOGIES APPLICABLE TO THE PLANNED LAND USE
- BEST AVAILABLE MANAGEMENT AND TECHNOLOGY AS DESCRIBED IN NRCS FIELD OFFICE TECHNICAL GUIDE

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WQMPS

- COVER THE ENTIRE FARM OR RANCH
- SPECIFICALLY DESIGNED TO ACHIEVE POLLUTION PREVENTION/ABATEMENT
- TEXAS WATER CODE §26.121

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WQMPS

- SITE SPECIFIC PLANS WITH A COMBINATION OF BMPS FOR THE TREATMENT OF IDENTIFIED RESOURCE CONCERNS
- BASED ON:
  - SOIL TYPES
  - PLANNED LAND USE/PRODUCTION GOALS
  - KNOWN/POTENTIAL WATER QUALITY/NATURAL RESOURCE PROBLEMS (SWAPA)
  - OTHER SITE SPECIFIC FACTORS (TOPO, ETC.)

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TECHNICAL CRITERIA FOR WQMPS

NRCS FIELD OFFICE TECHNICAL GUIDE (FOTG)

TO VIEW ALL APPROVED PRACTICES FOR SELECTED COUNTY:

- HTTP://EFOTG.NRCS.USDA.GOV/EFOTG_LOCATOR.ASPX?MAP=TX
- SELECT REGION
- SELECT COUNTY
- SELECT SECTION IV
- SELECT A. CONSERVATION PRACTICES

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FOTG "ESSENTIAL PRACTICES" FOR EACH LAND USE:

- CROPLAND
  - CONSERVATION CROP ROTATION
  - CONSERVATION TILLAGE
- PASTURELAND
  - PRESCRIBED GRAZING
  - LIVESTOCK WATER
- RANGELAND
  - PRESCRIBED GRAZING
  - LIVESTOCK WATER
- WILDLIFE
  - WILDLIFE MGMT.
- FORESTLAND
  - FOREST MGMT.

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WQMPS ALSO INCLUDE:

- NUTRIENT MANAGEMENT
- PEST MANAGEMENT
- ANIMAL WASTE MANAGEMENT SYSTEM
- WASTE UTILIZATION
- IRRIGATION WATER MANAGEMENT

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WHY HAVE A WQMP?

- ABATE/PREVENT EROSION AND PROMOTE CONSERVATION
- A STRATEGIC "MANAGEMENT" PLAN FOR YOUR OPERATION
- "ASSURANCE" POLICY – STATE-CERTIFIED PROOF THAT YOU ARE IMPLEMENTING CONSERVATION PRACTICES
- DEMONSTRATE THAT VOLUNTARY CONSERVATION PROGRAMS PROMOTE AGRICULTURAL PRODUCTION AND ENVIRONMENTAL QUALITY AS COMPATIBLE GOALS
- DEMONSTRATE THAT AGRICULTURE IS DOING OUR PART TO PROTECT WATER QUALITY
- RESOLVE WATER QUALITY COMPLAINTS THROUGH VOLUNTARY PROCESS WITH SWCD AND TSSWCB

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WQMPS

WHAT DOES A PLAN CONTAIN?

- DISTRICT-COOPERATOR AGREEMENT
- REQUEST FOR PLANNING ASSISTANCE
- SOILS MAP & INTERPRETATIONS
- CONSERVATION PLAN MAP
- NARRATIVE RECORD OF DECISIONS (PRACTICES) NEEDED TO IMPLEMENT WQMP
- IMPLEMENTATION SCHEDULE INDICATING YEARS PRACTICES ARE TO BE APPLI
- WORKSHEETS USED DURING THE INVENTORY AND PLANNING PROCESS OF DEVELOPING WQMP
- NRCS PRACTICE STANDARDS AND ENGINEERING DESIGNS
- SIGNATURE SHEET TO VERIFY INDIVIDUAL'S PRIVACY

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HOW TO GET A WQMP?

- AN INDIVIDUAL REQUESTS PLANNING ASSISTANCE THROUGH THEIR LOCAL SWCD
- THE WQMP IS USUALLY DEVELOPED BY THE SWCD TECHNICIAN WITH NRCS AND TSSWCB ASSISTANCE
- THE WQMP IS APPROVED BY THE LANDOWNER, THE SWCD AND NRCS AND THEN CERTIFIED BY THE TSSWCB
- PRODUCER IMPLEMENTS THE WQMP ON THEIR LAND
- ANNUAL STATUS REVIEWS ARE CONDUCTED TO ENSURE THAT THE LANDOWNER IMPLEMENTS BMPS AS AGREED TO IN THE IMPLEMENTATION SCHEDULE

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FINANCIAL ASSISTANCE

STATE (TSSWCB) OR FEDERAL (NRCS) ASSISTANCE IS OBTAINABLE FOR CERTAIN CONSERVATION PRACTICES

- TSSWCB
  - WQMP FINANCIAL ASSISTANCE (STATE)
  - CWA SECTION 319 FUNDING (FEDERAL)
- NRCS
  - FARM BILL PROGRAMS (FEDERAL)

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Questions?

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BRIAN KOCH

REGIONAL WATERSHED COORDINATOR

TSSWCB

WHARTON REGIONAL OFFICE

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WWW.TSSWCB.TEXAS.GOV

Questions?

Speaker Introduction

Dennis Brezina

- State Soil Health Specialist, United States Department of Agriculture - Natural Resources Conservation Service

USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

Combating Drought with Soil Health

Dennis Brezina, Soil Scientist, NRCS, Texas

FARM PRODUCTION AND CONSERVATION
FSA | NRCS | RMA | Business Center

Combating Drought with Soil Health

- You combat the conditions of drought and summer BEFORE it occurs.
- It's much easier to prevent the barn from catching fire than to try to put the fire out with a hose.
- Once you're into summer and drought, there's not much that you can do except to plan for the fall and next year's crop.

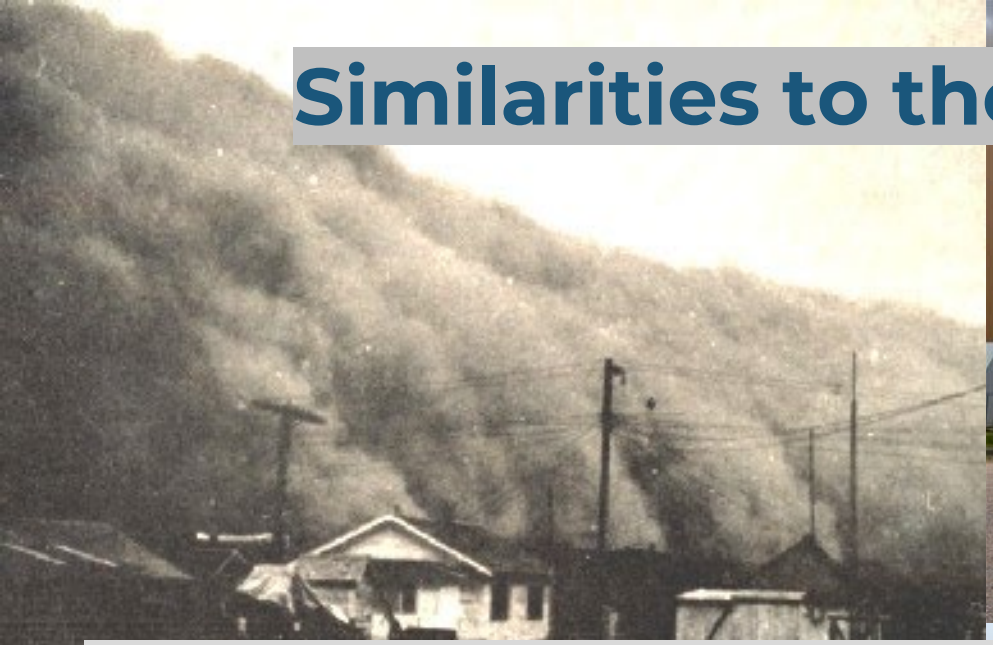
How much “better” we farm today

"Conquest of the Land through 7,000 Years“ by Dr. W.C. Lowdermilk
https://nrcspad.sc.egov.usda.gov/DistributionCenter/pdf.aspx?productID=109

How well are we actually farming?

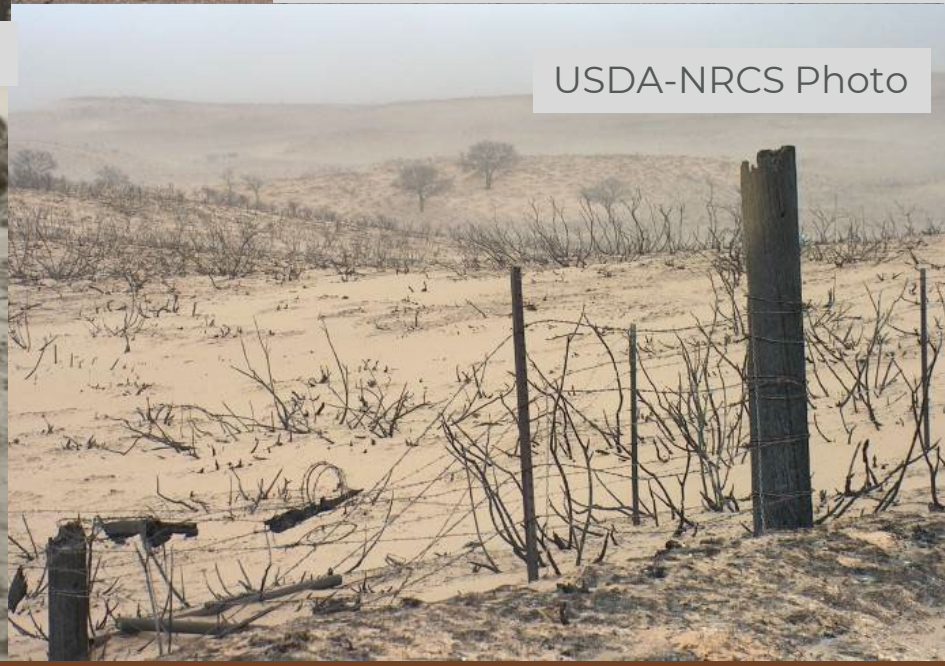
- Multiple-vehicle crash northwest of Lubbock, closes U.S. Highway 84, due to intense dust storm. – KCBD, April 17, 2019

Similarities to the Dust Bowl?



Dust Bowl photos (USDA-NRCS Photo Gallery)

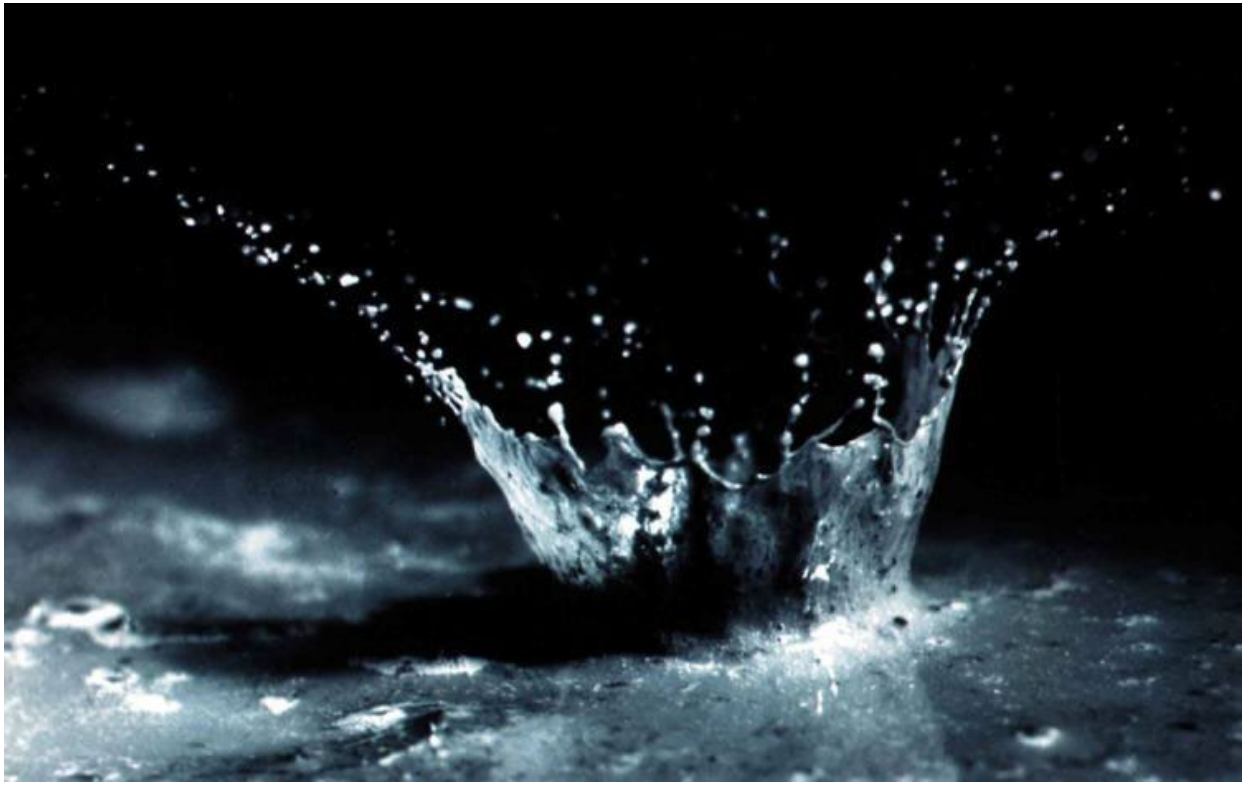
Kayla Schulte-Creek, USDA-NRCS



USDA-NRCS Photo

Raindrop Splash

https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/newsroom/multimedia/

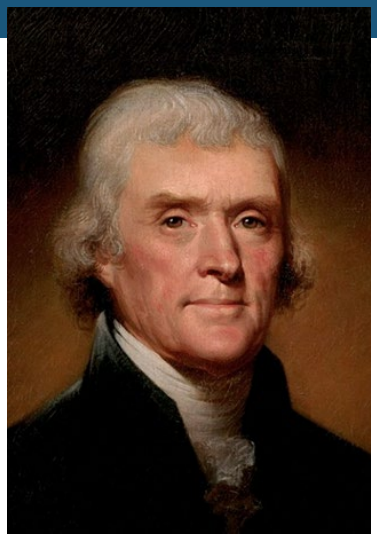


Arizona State University raindrop splash video
http://www.public.asu.edu/~mschmeec/rainsplash.html
NHTSA - 20 MPH Angled Frontal Impact Crash Test
https://www.youtube.com/watch?v=2LILDHUpoFY

Five Principles of Soil Health

- Soil Health: continued capacity of the soil to function as a vital living system that sustains plant and animal health.
- Cover the Soil
- Minimize Disturbance
- Plant Diversity
- Living Root throughout Year
- Livestock Integration

A New Look at an Old Practice



- Thomas Jefferson used turnips, buckwheat and vetch for cover crops at Monticello in 1794.
- "...indeed I think it important to separate my exhausting crops by alternations of amelioraters (sic)." -Letter to John Taylor
- Thomas Jefferson to John Taylor, 29 December 1794,
- Founders Online, National Archives, accessed September 29, 2019, https://founders.archives.gov/documents/Jefferson/01-28-02-0172 .

1930's Iowa Study

- Continuous Corn vs. Corn + Oats & Sweet Clover Rotation

Bushels/Acre	Year 5	Year 10	Year 15	Year 20
Continuous Corn	23.9	32.5	23.9	17.8
Rotation	25.8	57.0	72.0	83.9

- After the Study, no one in Iowa wanted to grow Continuous Corn.
- Year 21 - Applied 180 lbs. of N to both test fields:
- Continuous Corn 103 bu/A; Rotation 98.4

Soil Health is NOT for everyone

- Can a farmer in the Panhandle easily add animals?
- For that matter – Coast Prairie, Blackland, Brazos Bottom?
- Farmers & Ranchers doing the best they can
- NRCS is trying to offer them additional management options
- Ask the Producer what do you want?
  - Maximum Yields? Newest Equipment? First Bale? Maximize Income? Maximum Profit?
- Optimize Yield – Maximum Yields do NOT necessarily Maximize Profits.

Hydrology 101 - What happens to rainfall when it hits the ground?

Comparison of No-Till to Conventional Tillage

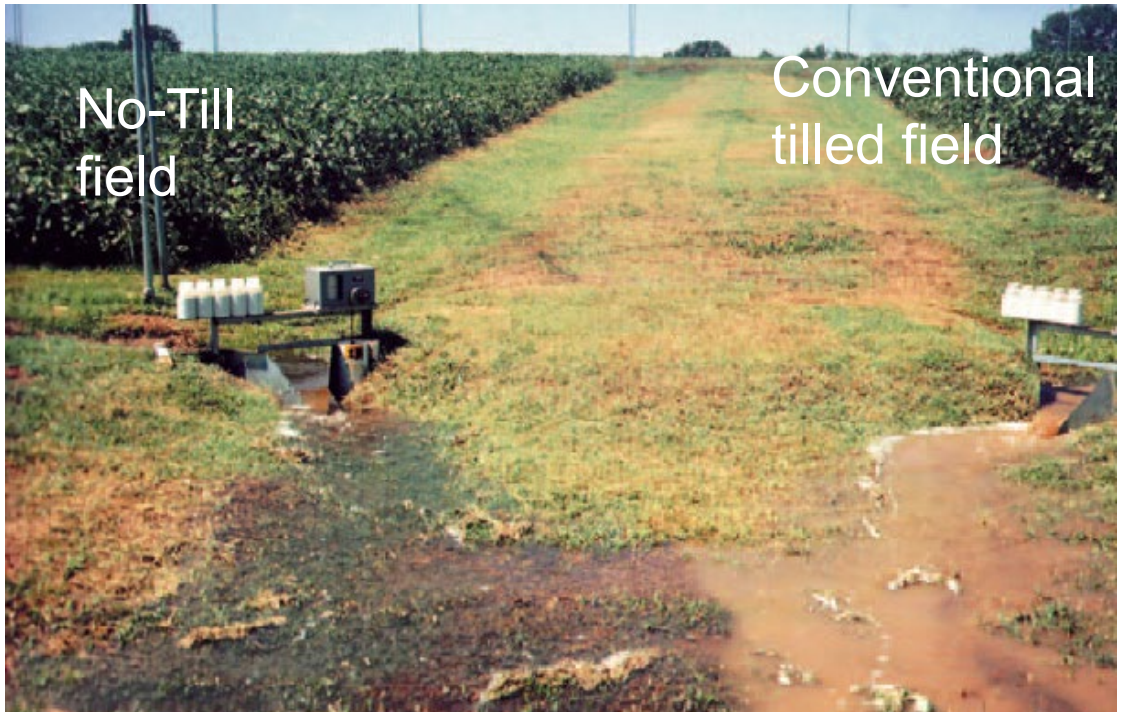
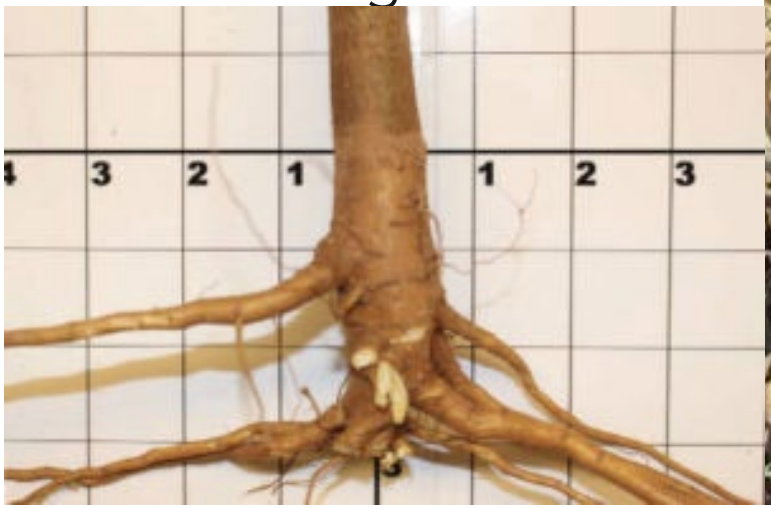


Photo: Milan Experiment Station-Milan, Tennessee
Doug Peterson Rainfall Simulator video:
https://www.youtube.com/watch?v=vwyH10486BY

Compaction & Penetration Resistance in the Natural World

- Plow pans and poor soil structure can cause poor root development
- J- or L- rooting



Photos: Left: Dennis Brezina, USDA-NRCS; Right: Cotton Farming.com
https://www.cottonfarming.com/current-issue/check-soil-for-compaction-layers/

Penetration Resistance in the Natural World

- Photos taken 6 minutes apart, Houston Black soils.

No-Till

Conventional Tillage

Photos: Nathan Haile, USDA-NRCS; April 26, 2013

Evapotranspiration (ET)

- Evapotranspiration: the sum of all processes by which water moves from the land surface to the atmosphere via evaporation and transpiration. (USGS definition)
- Dr. Dwayne Beck Dakota Lakes Research Farm
- Emphasizes a key point surrounding cover crops and water holding capacity: "Take the 'E' out of ET."
- Take the Evaporation out of Transpiration.
- https://www.farmprogress.com/crops/use-cover-crops-to-take-the-e-out-of-et

Infiltration with Different Management

- Infiltration vs. Ponding
- Conventional Tillage and Fallow reduces rainfall infiltration and increases surface Ponding

Photo: USDA-NRCS

USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

Planting into a Cover Crop

- Cotton; 60-inch rows; Rolled Cereal Rye Cover Crop
- Protects Soil from Erosion and captures every drop of rain

Photo: Dennis Brezina, USDA-NRCS

Soil Structure (due to Management)

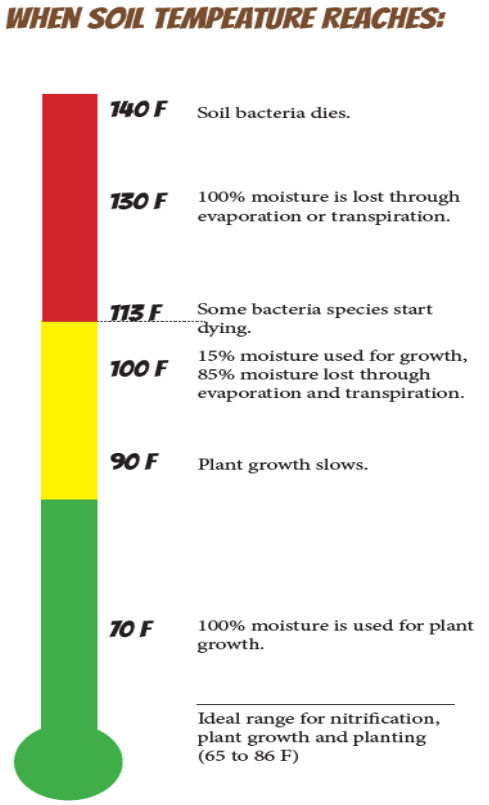
Photos: USDA-NRCS

Soil Structure (due to Management)

Photos: Dennis Brezina, USDA-NRCS

- September 20, 2020
- Soil structure difference
- No-Till vs. Conventional
- Soil temperature was 80 degrees in the top sample; 115 in the bottom.

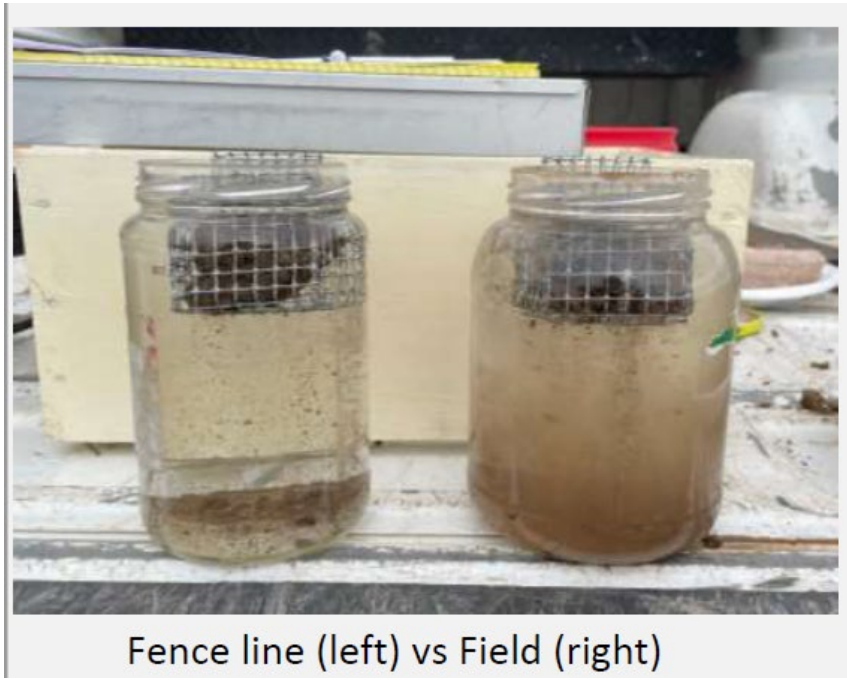
Soil Temperature



- --Soil Bacteria dies
- --100% moisture lost through evapotranspiration
- --15% moisture used for growth
- --85% moisture lost through evapotranspiration
- --100% moisture used for plant growth
- Soil Cover is “Air Conditioning” for the Soil.

USDA-NRCS Graphic; William M. Koos & Joe J. McEntire
USDA-Soil Conservation Service, *Soil and Water*, 1963.

Water Stable Aggregates



Fence line (left) vs Field (right)

- Slake Test for Aggregate Stability
- Soil Aggregate holds its shape from the No-Till Field or Range site.
- Individual Soil Particles from Conventional Tillage fall into suspension in the right jar.

Photo: Grant Teplicek, USDA-NRCS

Conventionally Tilled Soil in mid-August

Photo: Dennis Brezina, USDA-NRCS

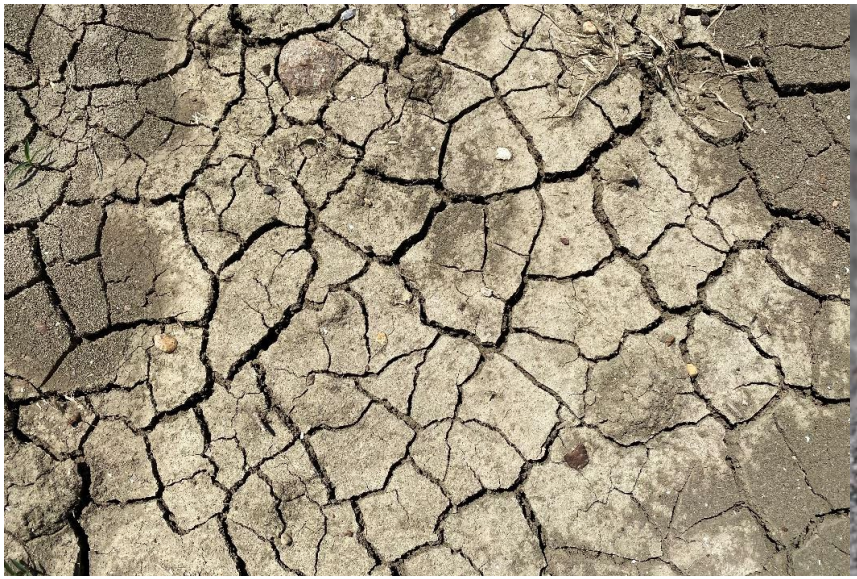
- How well can water infiltrate into this soil?

Water Stable Aggregates

Photo: Dennis Brezina, USDA-NRCS

- Difference in soil structure and compaction between a fence line on the left, vs. a compacted field on the right.

Crusting on Conventionally Tilled Field



- Crusts develop on the surface of Conventionally Tilled fields.
- These crusts can affect seed germination and plant growth of seedlings.

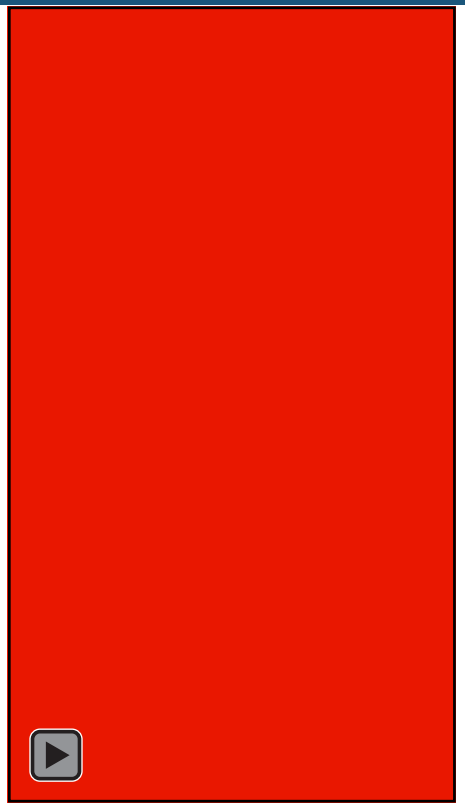
Photos: Dennis Brezina, USDA-NRCS (left); USDA-NRCS (right)

Clear Water vs. Cloudy Water
Nature's Slake Test

- Difference in water runoff between No-Till and Conventionally Tilled fields, 30 yards apart.

Photos: Dennis Brezina, USDA-NRCS

Video



- Video of the difference in water runoff between No-Till and Conventionally Tilled fields.

Videos: Dennis Brezina, USDA-NRCS

Soil Health Journey…

- Which direction you would like to go?

Photos: Dennis Brezina, USDA-NRCS

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Questions?

Wrap-Up

- If you submitted a RSVP for this webinar, you will receive an email with the presentation slides and a subsequent email with a link to the recording.

- All webinar slides and recordings are posted on NCTCOG's website under the green banner, "Webinars" here:

- https://www.nctcog.org/envir/natural-resources/water-resources

- If you did not RSVP and would like these webinar materials, please email aknox@nctcog.org.

Webinar Feedback

- Please provide your feedback on today's webinar in this 4-question survey. Thank you!

Provide Webinar Feedback Here

North Central Texas Council of Governments

Thank you for attending!

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United States Environmental Protection Agency

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